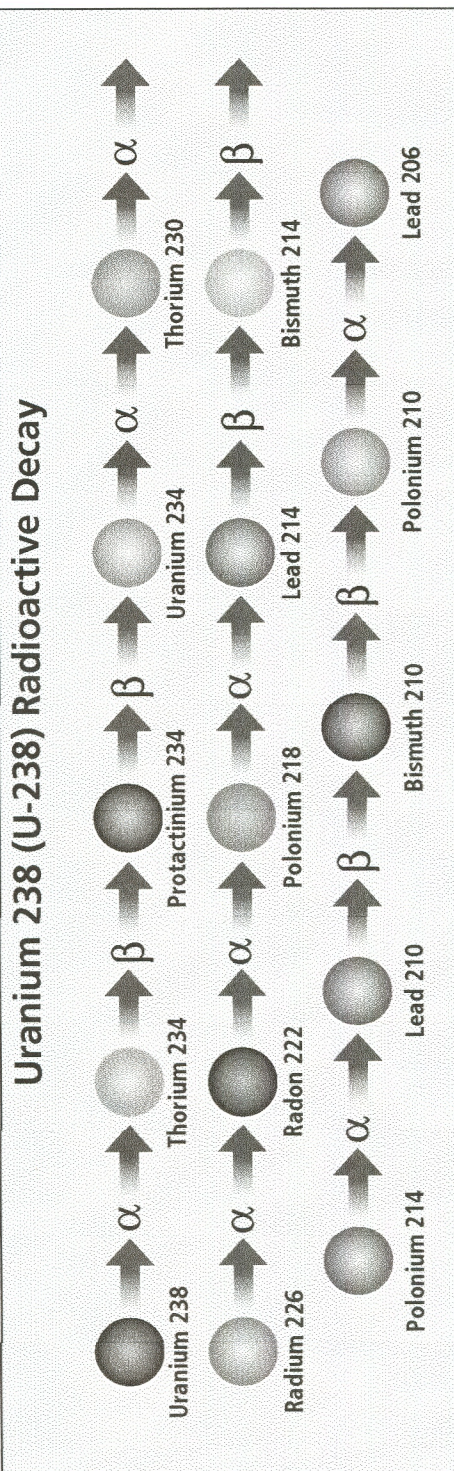


Radioactive Decay



Radioactive Decay of Carbon-14 to Nitrogen-14

	Percent Parent Element	Percent Daughter Element	Elapsed Years	Number of Half-Lives
Time 1	100	0	0	0
Time 2	50	50	5730	1
Time 3	25	75	11 560	2
Time 4	12.5	87.5	17 090	3

Radioactive Decay

1. What is the first radioactive element that forms when uranium-238 decays?

2. What is the half-life of uranium-238?

3. In the decay of uranium-238, how many radioactive isotopes form before stable lead-206 forms?

4. What radioactive element forms when bismuth-214 decays?

5. How is U-238 used to determine the age of a rock?

6. What nonradioactive element forms when carbon-14 decays?

7. How long does it take for 50% of a specific amount of carbon-14 to decay?

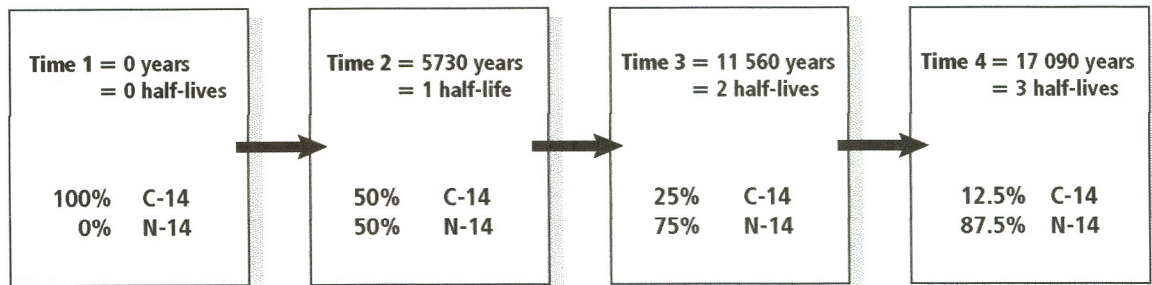
8. How many half-lives have passed after 11 560 years?

9. What percentage of carbon-14 remains after 2 half-lives?

10. What percentage of nitrogen-14 has formed after 2 half-lives?

SECTION 21.3 *Absolute-Age Dating of Rocks, continued*

In your textbook, read about radiometric dating using the radioactive isotope carbon-14.
Study the diagram. Then answer the questions that follow.



10. Which element shown is the radioactive isotope?

11. Which element shown is the stable nonradioactive element?

12. What is the half-life of C-14?

13. How many half-lives will it take for all but 25 percent of the original C-14 to decay?
How many years?

14. What percentage of C-14 remains after three half-lives?

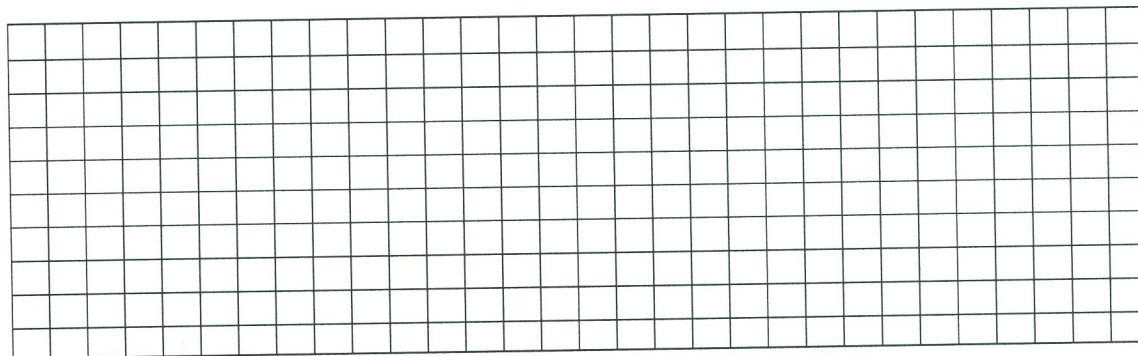
15. What percentage of N-14 forms after 17 090 years?

Half-Life and Radioactive Dating

Carbon-14 is a radioactive form of carbon. This form of carbon breaks down into another element and in the process releases radiation. The rate at which carbon-14 decays is constant.

Explore the decay of carbon-14 by graphing the carbon-14 and number of years.

	Number of years	Carbon-14	Decay Product
Start (0)	0	100 g	0.0 g
After 1 half-life	5,730	50 g	50.0 g
After 2nd half-life	11,460	25 g	75.0 g
After 3rd half-life	17,190	12.5 g	87.5 g
After 4th half-life	22,920	6.25 g	93.75 g
After 5th half-life	28,650	3.125 g	96.875 g



Use the table and graph to help answer the following questions.

1. Half-life is the amount of time it takes for _____ the atoms in a sample to decay.
2. The half-life of Carbon-14 is _____ years.
3. After 2 half-lives of Carbon-14 _____ years has passed.
4. You have a fossil that is 20,000 years old. About how many half-lives have gone by?

5. In a sample fossil about 10 grams of C-14 remains. The fossil started with 100 grams of C-14. How old is the fossil? _____